

**Patent Claims**

1. A rack and pinion steering system for a motor vehicle, having a steering housing (1) in which a rack (4) is mounted so as to be longitudinally displaceable, the rack (4) having a prismatic form with two bearing faces (4.1, 4.2) which are inclined at an angle to the toothed plane and symmetrically with respect to the toothed side, and having a pinion (3.1), which meshes with the rack (4), and a pressure piece (5) which is arranged on that side of the rack (4) which lies opposite the engagement side with the pinion (3.1) and has a back pressure face which rolls without sliding on the bearing faces (4.1, 4.2) of the rack (4), the pressure piece (5) being prestressed in the axial direction against the rack (4) with the aid of a spring (7), wherein the pressure piece (5) has two bearing faces (5.1, 5.2) which lie opposite one another and are inclined with respect to one another, at least in each case one axial roller bearing (9, 10) with in each case two runner plates (9.1, 9.2, 10.1, 10.2) and a rolling body set (9.3, 10.3) situated between them being arranged in the bearing faces (5.1, 5.2) of the pressure piece (5) which lie opposite one another, one runner plate (9.2, 10.2) of said axial roller bearing (9, 10) being held

fixedly in the pressure piece (5) so as to rotate with it, and the other rotatable runner plate (9.1, 10.1) of said axial roller bearing (9, 10) extending inclined at a defined angle  $\alpha$  with respect to the bearing face (4.1, 4.2) of the rack (4), with the result that a point of contact (9.5, 10.6) is formed between the bearing face (4.1, 4.2) of the rack (4) and the rotatable runner plate (9.1, 10.1).

2. The rack and pinion steering system as claimed in claim 1, wherein the rack (4) has a Y-shaped profile.

3. The rack and pinion steering system as claimed in claim 1, wherein the rotatable runner plate (9.1, 10.1) is of spherical cap configuration and its convex spherical cap face is in punctiform contact with the bearing face (4.1, 4.2) of the rack (4).

4. The rack and pinion steering system as claimed in claim 1, wherein the axial roller bearing is a ball bearing (9).

5. The rack and pinion steering system as claimed in claim 1, wherein the axial roller bearing is a needle bearing.

6. The rack and pinion steering system as claimed in claim

4, wherein that runner plate of the ball bearing (9) which is arranged fixedly in terms of rotation in the pressure piece (5) is configured as a sleeve (9.8) which engages around the runner plate (9.1) of spherical cap configuration with its edge (9.9).

7. The rack and pinion steering system as claimed in claim 5, wherein the axial roller bearing is configured as an axial angular contact needle bearing (10), the bearing needles (10.3) of which are guided in a cage (10.4).

8. The rack and pinion steering system as claimed in claim 4, wherein the rotatable runner plate (9.1) of the ball bearing (9) is of mushroom-shaped configuration with a stem (9.10) and a convex spherical cap face, the stem (9.10) being accommodated by a sleeve (9.11), the needle ring (9.12) of which surrounds the stem (9.10).

9. The rack and pinion steering system as claimed in claim 1, wherein the runner plates (9.1, 9.2) of the axial roller bearing (9) are connected to one another by a retaining element (9.4).

10. The rack and pinion steering system as claimed in claim

1, wherein the axial roller bearing (9, 10) is inserted into a blind hole (5.6) of the pressure piece (5).

11. The rack and pinion steering system as claimed in claim 1, wherein the axial roller bearing (9, 10) is pressed into a through hole (5.7) in the pressure piece (5).

12. The rack and pinion steering system as claimed in claim 1, wherein the component parts (9.1, 9.2, 10.1, 10.2, 9.8, 9.11) of the axial roller bearings (9, 10) are manufactured at least partially by a chipless shaping operation.

13. The rack and pinion steering system according to the preamble of claim 1, wherein the pressure piece (5) has two bearing faces (5.1, 5.2) which lie opposite one another and are inclined with respect to one another, at least in each case one axial sliding bearing (11) with in each case two runner plates (11.1, 11.3) being accommodated in the bearing faces (5.1, 5.2) of the pressure piece (5) which lie opposite one another, one runner plate (11.3) of said axial sliding bearing (11) being held fixedly in the pressure piece (5) so as to rotate with it, and the other rotatable runner plate (11.1) of said axial sliding bearing (11) extending inclined at a defined angle  $\alpha$  with respect to the bearing face (4.1,

4.2) of the rack (4), with the result that a point of contact (11.7) is formed between the bearing face (4.1, 4.2) of the rack (4) and the rotatable runner plate (11.1).

14. The rack and pinion steering system as claimed in claim 13, wherein the rotatable runner plate (11.1) is of mushroom-shaped configuration with a stem (11.2) and a convex spherical cap face, the runner plate which is fixed in terms of rotation is configured as a sleeve (11.3), the base (11.4) of which is provided with an axially oriented projection (11.5), the axially oriented projection (11.5) being in contact with the base of the stem (11.2), and bearing needles (11.6) being arranged between a circumferential surface of the stem (11.2) and the sleeve (11.3).

15. A rack and pinion steering system for a motor vehicle, having a steering housing (1) in which a rack (12) is mounted so as to be longitudinally displaceable, the back of said rack (12) which lies opposite a toothing system having an arcuate form, and having a pinion (3.1) which meshes with the rack (12), and having a pressure piece (13) which is arranged on that side of the rack (12) which lies opposite the engagement side with the pinion (3.1) and has a back pressure face which rolls without sliding on the rack (12), the

pressure piece (13) being prestressed in the axial direction against the rack (12) with the aid of a spring (7), wherein the pressure piece (13) has two bearing faces (13.1, 13.2) which lie opposite one another and are inclined with respect to one another, at least in each case one axial roller bearing (9) with in each case two runner plates (9.1, 9.2) and a rolling body set (9.3) situated between them being arranged in the bearing faces (13.1, 13.2), one runner plate (9.2) of said axial roller bearing (9) being held fixedly in the pressure piece (13) so as to rotate with it, and the other rotatable runner plate (9.1) of said axial roller bearing (9) forming a point of contact (9.5) with the rack (12).

16. The rack and pinion steering system as claimed in claim 15, wherein the rack (12) is provided with a longitudinal recess (12.1) which is adapted to the profile of the rotatable runner plate (9.1).